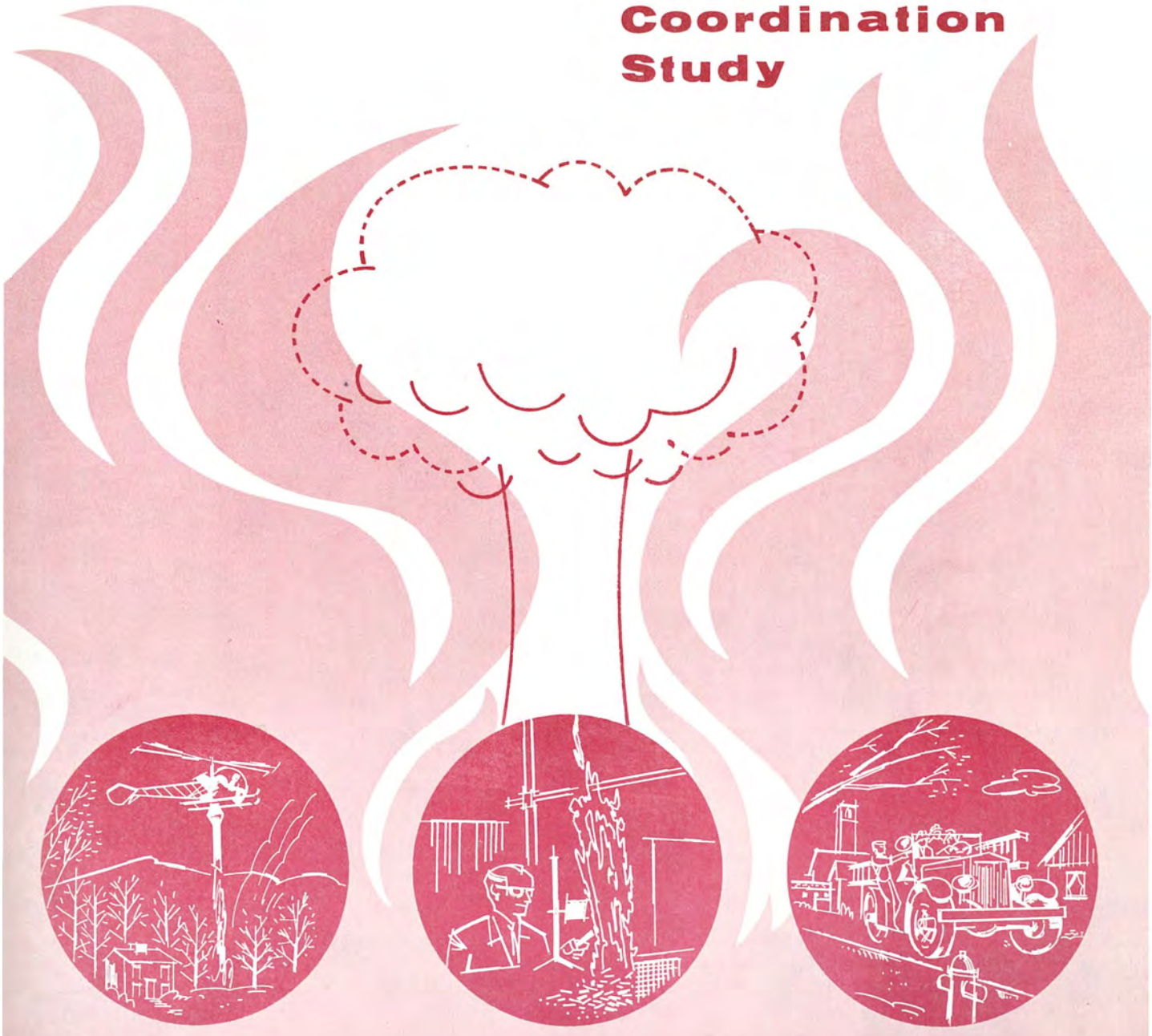
Roseburg, Oregon

THE 1959 EXPLOSION AND FIRE

National Fire Coordination Study



U.S. DEPARTMENT OF AGRICULTURE/FOREST SERVICE/DIVISION OF FIRE CONTROL

Roseburg, Oregon

THE 1959 EXPLOSION AND FIRE

A study of the blast and fire to identify lessons applicable to nuclear fire defense.

A Working Paper Prepared

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INTRODUCTION

Early in the National Fire Coordination Study it was determined that fire would be a significant cause of loss of resources and threat to lives if a nuclear attack occurred. During the study several peacetime fires were examined for the purpose of applying peacetime lessons to the nuclear fire threat. Among these, the Roseburg Fire was selected because of the problems that resulted from it's accompanying blast. Although it had been thoroughly studied previously, the earlier reports did not relate their findings to the problem of nuclear fire. Since many of the details set forth in past studies are not repeated here, the National Board of Fire Underwriters report is recommended to those who want complete information.[1/]

THE SITUATION

Roseburg is a thriving small city of about 12,200 residents. Lumbering, agriculture, and tourism generate a level of activity out of proportion to Roseburg's size.

1/ The Roseburg, Oregon, Fire Explosion and Conflagration, August 7, 1959, by the National Board of Fire Underwriters and Oregon Insurance Rating Bureau.

Three states characterized the 1959 disaster: (1) the initial warehouse fire, well established upon discovery about 1:00 a. m., (2) the explosion that decimated firefighting forces and scattered flaming debris, and (3) the fire that involved 45 buildings in a 7 block area. The N. B. F. U. report[1/] summarizes:

> "A truck containing two tons of dynamite and four and one-half tons of blasting agent, trade named "Car-Prill", a mixture of prilled ammoniam nitrate, ground nut shells and diesel oil, exploded with great violence and devastated the downtown section of the city of Roseburg, Oregon on Friday, August 7, 1959 at about 1:00 a.m. The explosion, which was probably initiated by the intense heat from a nearby fire, killed thirteen persons and injured more than a hundred and twenty-five others. Property damage will probably exceed nine million dollars with most of the loss sustained in the areas adjacent to and including the principal business district of the city. A crater, fifty-two feet in diameter and twenty feet deep gave mute evidence to the terrific force of the blast. Most of the buildings in the immediate twelve blocks were completely destroyed. Hundreds of other buildings in the community suffered extensive damage over a fifty-block area, and glass breakage was reported as far as nine miles from the explosion. Tremors were reported as far away as seventeen miles. Fires soon appeared in numerous buildings in the surrounding area. These fires were apparently started by radiant heat and flaming debris scattered by the explosion. More than forty-five buildings were involved. The conflagration was confined to a seven block area through the combined efforts of the local fire department and fire companies from nearby districts and nearby cities. The fire was brought under control in two hours."

1/ The Roseburg, Oregon, Fire Explosion and Conflagration, August 7, 1959, by the National Board of Fire Underwriters and Oregon Insurance Rating Bureau.

Roseburg has a brief written agreement for aid, with other departments in Douglas County and with nearby cities. Under this aid plan the following forces responded: Roseburg Rural Fire Department with 24 firemen and three pumpers, City of Sutherlin from 16 miles with one fireman and one pumper, City of Myrtle Creek with four firemen and one pumper, Veterans Administration at Roseburg with three firemen and a pumper.

Eugene and Springfield responded with 14 firemen and three pumpers which arrived about 3:00 a.m. as the fires were coming under control.

During the critical control period there were 57 firemen and seven pumpers in action.

Besides fire services, the city police, state police, sheriff's department and the local national guard unit was involved. Additional troops were requested and arrived at 3:00 a.m. The Red Cross, Salvation Army, and Civil Defense rendered aid and assistance. State and Federal wildland fire services are not included in the aid agreement and were not involved in this fire.

Assignments of responding units were made on a first come, priority basis, to the perimeter of the main fire and damage area. There was no common radio frequency that spanned jurisdictional boundaries,

nor truck to truck radio between departments. Communication was further hampered by the power failure that knocked out the Roseburg Fire Department base station.

Less than 400 feet from the blast scene a 166,000-gallon liquefied petroleum gas storage area was located. Pre-disaster planning for recognition of priorities prevented almost certain explosion of the LP gas tanks. Pre-emergency training was effective in protecting these hazards; and in providing a "wall of water" around the fire. City mains provided adequate pressure but were the only source of water. A water main within 15 feet of the blast crater was undamaged. No auxiliary water system was available nor was there access to the nearby river. But planning and training done prior to the disaster resulted in the ready recognition of priorities, and contributed to strategy and the tactics used to control the fire.

Support by the sheriff, police, and the National Guard kept the streets clear and people from the danger area. Command of these multi-organizational forces could well have been a problem but because of planning and training it was not. Don O'Brien editorialized in "Fire Engineering" of October 1959.

> "In this instance the fire chief was unfortunately stricken with a heart attack and his assistant killed by a terrifying explosion. The mantle of command immediately fell on the shoulders of a young lieutenant-training officer, who without panic, sized up what to this time was the greatest fire problem ever to face the

city. He quickly rallied the depleted forces, committed them to a last ditch stand, then directed the mutual aid companies responding to calls for assistance in a manner which soon brought the fire under control ----- Similar disasters most likely will occur in other communities in the future. While there is still time, every firefighter, regardless of rank, should be given the opportunity to prepare himself to face the eventuality. When such an emergency occurs it will then be too late for anything but action."

The fire lieutenant in command was on the line, placing pumpers, and directing all operations by car, on foot, and via mobile radio. No system other than judgment was used to estimate control force requirements. However, at Roseburg, control objectives were identified and met. These were: (a) to prevent explosion of the LP gas tanks, (b) to evacuate endangered people, (c) to confine and suppress the fire.

Even in a nuclear situation with radioactive fallout limiting exposure of firefighters to one hour, these objectives could have been partly achieved. But because complete extinguishment of all fires could not have been accomplished in an hour, later spread would probably have threatened the sheltered population. If fallout had prevented all control effort, Roseburg's Fire Chief estimated that ten to twenty times the number of structures would have burned. In this case, evacuation of approximately 5,000 people would have been required instead of the three or four hundred actually evacuated during the disaster.

Critical fire weather would have increased the fire threat. According to the firemen accumulated debris in the fire area caused the fire to spread rapidly even with night-time humidities and no wind.

Some of the evacuated people were removed forcefully from a second class hotel apartment house. Sheriff's deputies and city police, with the assistance of civilians, carried out the evacuation in two hours with no casualties. This cleared the area for effective fire control action and the movement of equipment. Several motels and hotels threw open their rooms for displaced persons without charge and thus set the tone for cooperative effort by the citizens and business houses.

Flying brands started numerous small fires. Without direction, citizens independently suppressed several of these. Firemen were all committed to the major fires and to priority targets. They later estimated that the loss would have been much greater without the citizens' efforts.

The Civil Defense role in this emergency does not appear to have been significant. Complete information on shelters was not available at the time of this study. There are a few shelter areas marked. They are in partial basements as there are almost no full basements in Roseburg. Like many other West Coast communities, Roseburg

does not consider shelters to be of primary importance. This is due to their geographical location upwind from most assumed target areas.

SIGNIFICANT LESSONS

Action taken during the Roseburg disaster contains several lessons of value to the whole program of fire defense during a nuclear attack.

The young lieutenant, after finding the assistant chief dead, demonstrated the value of training in the command function. He assumed command, ordered additional aid, and reorganized the forces.

Citizens, both with and without direction, took action to help evacuate others from damaged, burning, and threatened buildings.

Citizens without special training and supervision independently suppressed dozens of small fires. Without this action some fires could have become major blazes.

Professional firemen in Pumper Crew No. 4 recovered after the explosion, recognized danger from the LP gas storage tanks, and concentrated on defending this hazard from the fire. They demonstrated the soundness of selective fire defense.

Response in force by the Roseburg Rural Fire Department was a significant factor in early control of the fire. Similarly the nuclear fire problem will not be confined to either urban or rural areas. All fire services in the problem area will face the threat together.

The prompt response by other fire services according to the established aid plan made control possible. Even so, the limit of planned aid was approached. Without this plan, the Roseburg firemen would have been overwhelmed for several hours. This illustrates the need for planning on a broad area basis in preparation for nuclear fire.

In this community there was complete dependence on a single water source for all control action. Fortunately, the nearby main was not ruptured by the blast. To assure protection against nuclear fires, auxiliary water supplies, access and pumping equipment would be needed.

The shut-off of power that disrupted radio communications shows the need for auxiliary power for essential services. A low capacity inexpensive unit would supply adequate power for the base radio station, thereby assuring communications.

With no resource locator nor dispatcher's data display system, the Roseburg dispatcher and acting chief were dependent on memory and hand-logged notes. The problem was fast outgrowing their ability to coordinate their resources. A dependable data display and storage system would be a valuable aid during nuclear attack.

Morale of firemen and citizens and their ability to fight fire was apparently unaffected by the casualties and by shock. Their response speaks well for the ability of the Nation to survive and recover from nuclear attack.